Amendments to the Specification:

Please amend the paragraph beginning on page 6, at line 19 as shown below:

In one embodiment of the present invention, a method for sputter coating a substrate utilizing a hollow cathode in a sputter coating reactor is provided. The method of the invention comprises providing a channel (i.e., a cathode channel) for gas to flow through, the channel defined by a channel defining surface wherein one or more portions of the channel-defining surface include at least one target material. Typically, the channel defining surface is part of the cathode of a sputtering system and has a rectangular cross section. Gas is flowed through the channel wherein at least a portion of the gas is a non-laminarly flowing gas. Preferably, this gas will be an inert gas such as argon. Such inert gases are sometimes referred to as working gases in that these gases are used to sputter off material from target surfaces. Figures 1 A through D are schematics illustrating laminar flow and the methods of the present invention. With reference to Figures 1 A and B, gas is introduced from nozzle 2 into channel 4. Prior to entering channel 4, the gas impinges on baffle 6 which helps in mixing. While the gas is flowing through channel 4 a plasma is generated causing target material to be sputtered off the channel-defining surface 8 to form a gaseous mixture containing target atoms that are transported to substrate 10. With reference to Figure 1C, a configuration suitable for small gap cathodes is provided. In this configuration, non-laminar flow is induced by placing nozzle 2 within channel 4. This causes gas that impinges on baffle 6 to be forced at a relatively higher velocity through narrow passage 12 which is formed between nozzle 2 and channel-defining surfaces 8. The higher velocity gas flow close to the target surface is maintained across the length of the channel from entrance to exit or across at least part of the channel. With reference to Figure 1D, a configuration that is suitable for large gap cathodes is provided. In this configuration, nozzle 2 is placed in channel 4. Gas emerging from nozzle 2 is forced to flow through flow directing shield 14 which directs the gas in a number of non-parallel directions. It will be appreciated that the flow directing properties of shield 14 may be built directly into nozzle 2 by having orifices in nozzle 2 that direct the gas in non-parallel directions. The requirement that the gas be flowing non-laminarly is important in achieving

the advantages of the present invention. A preferred way to achieve non-laminar flow is by inducing turbulence. Typically, turbulent flow is characterized as having a Reynolds number greater than 2000. A slightly different preferred way of achieving non-laminar flow is by having different portions of the gas flow in different directions. In its simplest embodiment of this concept, a first portion of gas in a first direction and a second portion of gas is a second direction wherein the first direction and the second direction are substantially non-parallel. With reference to Figure 2 a perspective view of gas nozzle ~~12~~ 13 which introduces a gas into the channel is provided. Typically, the gas will be introduced into a sputtering reactor through a manifold ~~14~~ 15 with a series of orifices 16 from which the gas emerges. Accordingly, the non-laminarly flowing gas is formed by flowing the gas through at least two orifices such that at least two gas streams emerging from the at least two orifices are flowing in substantially non-parallel directions. In practice, however, the manifold will contain numerous orifices wherein two adjacent orifices will direct the gas flow in different non-parallel directions.

Please amend the paragraph beginning on page 12, at line 14 as shown below:

In another embodiment of the present invention, a method for depositing a nitride film on a substrate in a sputter coating reactor is provided. The method of this embodiment comprises providing a channel for a working gas to flow through, the channel defined by a channel-defining surface wherein one or more portions of the channel-defining surface include at least one target material. The working gas is then flowed through the channel wherein at least a portion of the working gas flows non-laminarly. While the working gas is flowing, a plasma is generated wherein a portion of the target material is sputtered off the at least one target material to form a gaseous mixture containing target atoms. Finally, a reactive gas comprising ~~comprising~~ molecular nitrogen is introduced into the sputter coating reactor, wherein a nitride film is deposited on the substrate. In one variation of this embodiment the reactive gas is introduced at a position located outside of the channel from which the gaseous mixture emerges. In a particularly preferred variation of this embodiment, the reactive gas is combined with the working gas (e.g. Ar) while it is flowed through the channel (i.e., the cathode channel.) The need to mix the reactive gas and the working gas in the cathode channel is likely due to the lower reactivity of nitrogen gas compared to oxygen.

The success may relate to the relatively high electrical conductivity of many metal nitrides. The configuration of the at least one target material is the same as set forth above. For example, the at least one target material includes a first target material and a second target material; and the first target material and the second target material are the same or different. In this configuration, the first target material is preferably opposite the second target material. Moreover, the at least one target material typically comprises a metal, metal alloy, or semiconductor. Preferably, the at least one target material comprises a component selected from the group consisting of zinc, copper, aluminum, silicon, tin, indium, magnesium, titanium, chromium, molybdenum, nickel, yttrium, zirconium, niobium, cadmium, vanadium, hafnium, tungsten, and mixtures thereof. Examples of nitrides that may be made by the method of this embodiment include titanium nitride, indium nitride, aluminum nitride, chromium nitride, vanadium nitride, tungsten nitride, copper nitride, zirconium nitride, or mixtures thereof.

Please amend the paragraph beginning on page 13, at line 13 as shown below:

With reference to Figure 5A a schematic of the sputter-coating system of the present invention is provided. Sputter system 60 includes cathode 62 into which a non reactive gas such as argon is introduced into injector 64 by tube 66. Cathode 62 is powered by high voltage power supply 68. Within cathode 62 a gaseous mixture containing target atoms as set forth above is formed and transported toward substrate 70. Upon emerging from cathode 62, the gaseous mixture combines with a reactive gas that is introduced from manifold 72. Low pressure is maintained within chamber 74 by the operation of throttle valve 76 and pumping system 78. Moreover, substrate 70 is heated by heating lamps 80 and transported through the sputtering system by transport mechanism 82. With reference to Figure 5B, a schematic cross-section of cathode 62 is provided. Cathode 62 includes targets 90, 92 which are made of materials as set forth above. Targets 90,92 are powered through electrical feed 94. Cathode 62 is cooled via copper cooling block 96 which is water cooled. Water is introduced into copper cooling block 96 through teflon tube 98 which snakes through leak tight adapter 100. Teflon tube 98 attaches to copper cooling block 96 via connector 102. Similarly, water is removed from copper cooling block 96 through teflon tube 104 which snakes through leak tight

adapter 106. Teflon tube 104 attaches to copper cooling block 96 via connector 110. Back section 112 is electrically isolated from cooling section 96 and targets 90, 92 by ceramic insulators 114, 116. Cathode 62 also includes dark shield 118 and ceramic support ~~120~~ which holds cathode 62 in place. A non-reactive gas such as argon is introduced into the cathode by inlet 122. The gas then emerges from nozzle 124. Next the gas is redirected by flow directing shield 126 which causes the gas to flow in non-parallel directions. The gas enters channel 128 wherein a plasma is generated and material is sputtered off of targets 90, 92. The resulting gaseous mixture includes target material atoms which are transported to the substrate. Reactive gas manifold 130 is positioned near the exit of channel 128. Reactive gas manifold 130 introduces a reactive gas that mixes with the gaseous mixture that includes the target atoms.

Please amend the table beginning on page 15, at line 11 as shown below:

Table 1. Resistivity of copper ~~oxide~~ films

deposition conditions	**film resistivity (microhm cm)**
unheated substrate	8.5
bias -30V, unheated substrate	4.2
bias -15 V, substrate 70 °C	3.9
substrate heated to 70 °C	3.3
bias -30V, substrate 70 °C	2.4